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## PSYCHOLOGICAL LITERATURE.

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- (67) *Raumaesthetik und geometrisch-optische Täuschungen.* Von THEODOR LIPPS. Mit 183 Figuren und Einer Tafel. Schriften der Gesellschaft für psychologische Forschung: Heft 9 u. 10, 2te Sammlung. Leipzig: Verlag von J. A. Barth, 1897, pp. viii, 424.

*Die geometrisch-optischen Täuschungen.* Von WILHELM WUNDT. Des xxiv. Bandes der Abh. der math.-phys. Classe der kgl. sachs. Ges. der Wiss. no. 2. Mit 65 Textfiguren. Leipzig, B. G. Teubner, 1798, pp. 126.

In the *Beiträge zur Psychologie und Physiologie der Sinnesorgane*, the *Festschrift* prepared for Helmholtz' seventieth birthday (1891), Professor Lipps published a long paper (93 pages), entitled *Ästhetische Faktoren der Raumanschauung*. This paper should be studied before the reader ventures upon the book now before us; it gives an abstract and brief chronicle of the author's æsthetic theory, and of his view of the relation of the æsthetic problem to the problem of the geometrical optical illusions. Again, in the *Zeitschr. f. Psych. und Phys. der Sinnesorgane*, Bd. xii, Heft 1, is a preliminary communication upon the latter question, headed *Die geometrisch-optischen Täuschungen*. This should be read alongside of the book, as furnishing a conspectus of the author's treatment in the larger work.<sup>1</sup>

The fundamental idea of all these publications is that "the optical and the æsthetic impressions that a geometrical form makes upon us are merely two sides of one and the same thing, having their common root in ideas of mechanical activities." Every space formation, all formed space, is the seat or vehicle of living force; it strives or tends to rise or expand, it resists, yields, moves, runs out, etc., etc. In a word, it shows us the manner of its origin, the natural reason why it takes on just this form,—always, of course, after the analogy of our own human activity; and its æsthetic consideration is simply the translation of its presence or bare existence into this activity. As human action is directed upon some end, so is the activity in the space form: the principle of æsthetic freedom includes the free determination and the free realization of an end. Geometrical forms are ugly only (and always) when the force or life that is in them cannot work itself out, or is compelled to subserve the wrong end, to play an ill-fitting rôle. (Pp. 1-26.)

The 'naturalness' of a form, however, has its mechanical side. The 'free realization of an end' is at the same time mechanical uniformity, obedience to mechanical law. Not the mechanically regular form is beautiful, but the form which shows the free working out of a definite mechanical movement. Past experiences have given us a direct, not consciously mediated, 'feeling' for mechanical possibility; we 'feel' that in a particular figure the movement is assured, easy, effortless, while in another it is uncertain, unstable, forced. Putting this together with the result reached in the pre-

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<sup>1</sup>A good discussion of the whole topic of geometrical-optical illusions will be found in ch. vii of Professor Sanford's "Laboratory Course."

ceeding paragraph, we arrive at the principle of 'æsthetical-mechanical unity.' The column or the wave line is æsthetic: imagination reads human activity into it; it is mechanically right, the expression of mechanical uniformity; and it is, further, unity—the action of a personality, the working out of one mechanical force, given once and for all. (Pp. 26-41.)

The unity of 'becoming' or of self-production which the space form evinces, which in virtue of its æsthetical-mechanical interpretation in our feeling it must evince, may be of various kinds. We can distinguish successive from simultaneous unity, the unity of the column from the unity of the group or cluster of columns. The former we may call quantitative or singular unity; the latter, qualitative unity with quantitative differentiation. In the third place stands antagonistic or central unity, that of opposed activities arising from a common source. Prototype of (1) is the human volition directed upon a single point; prototype of (2), a human activity rooted in a single, qualitatively identical volition, but embracing a manifold as its object; prototype of (3), the volition that aims singly, with opposition of direction (stretching out the arms, *e. g.*). The relation of this theory to the doctrine of 'multiplicity in unity' is obvious. It only needs to be added that the unity of opposition implies the principle of equilibrium. (Pp. 42-50.)

The principle of equilibrium is wanted, however, in a wider sense. Every space form shows the balance of activity and counter-tendency. There would be no activity in a form at all, were not the form constantly threatened by, obliged to maintain itself against, the counter-activity. Nevertheless, in every concrete case, it is one of these activities that is, for our idea, the primary or 'real' activity of the form, while the antagonistic activity appears as a merely secondary tendency. The terms are, naturally, correlative. Thus, if we oppose the limiting activity of boundary lines to the expansive activity of the enclosed space, it is clear that limitation is the primary activity, expansion the secondary counter-tendency. Again, in the vertical figure which is conditioned (positively or negatively) by gravity, it is the activity of expansion or extension that is primary, the counter-activity or tendency that is secondary. And thirdly, in the case of direction of movement, the diverting activity is primary, the tendency to continuation in a straight line secondary. These three antagonisms are of prime importance for the theory of optical illusions, to which we now pass. (Pp. 50-60.)

These illusions arise as we ideate the forces of space forms, *i. e.*, let them work themselves out in our idea. We perceive a form; we have an idea of the activity producing it; this implies the idea of the working out of the activity; this idea is superimposed on the perception,—the activity works itself out; and the illusion is there. Note, then, that the illusion is not due to perception, but to deception of judgment; we compare perceptions under circumstances in which modifying ideas force themselves upon us, and the judgment of comparison is itself modified in the direction of these ideas. In other words: we superpose, in comparing, the modified memory-image of the one perception upon the other perception-image. The concomitant, modifying ideas are 'unconscious.' (Pp. 61-69, 203, 339, 368, viii, etc.) The reader will now understand how it is that the first sketch of Professor Lipps' theory appeared in the *Helmholtz Festschrift*.

Although the detailed exposition of the rest of the book adopts a classification by geometrical form, in place of that by the threefold antagonism of activity and counter-tendency mentioned above, the first section deals with the illusions of expansion and limitation

(pp. 70-140). We set out with the general rule, whose deduction is evident, that limited space magnitudes are as such underestimated. But the boundaries of a form may be 'mere' boundaries, or may themselves, *e. g.*, be 'forms.' So we get the rule of the 'concurrence' of interpretative ideas, and the distinction of 'grades' of limitation. If counter-boundaries differ in grade, illusions necessarily follow. Vertical extension is overestimated as compared with horizontal, since it is doubly extended: from below upwards by the force opposing gravity, from above downwards by gravity itself,—both primary activities. Exceptions must occur, under certain circumstances: when, *e. g.*, the concurrence of horizontal and vertical is replaced in idea by some other play of forces (circle), or when the vertical is subordinate in idea to the horizontal expansion (torus). Further: we may distinguish 'degree' of limitation from grade of limitation. Increase the bounding power of a boundary by making a figure smaller than it was, and you increase the grade of limitation, in arithmetical progression. But you do more: you increase the degree of limitation. For increase of limiting activity means increase of the counter-tendency, the expansion, or resistance to limitation; your boundary bounds, therefore, in higher degree, at a higher stage of limitation than it did before. And the reduction of the counter-tendency takes place in geometrical progression. Here, again, is occasion for illusion and modification of illusion. Besides, the question arises: when are we to regard the smaller figure as identical with the larger, *i. e.*, as the vehicle of an equal expansive tendency, and when are we to suppose that its initial expansive tendency was less? So we are led to the illusions of confluxion (linear) and contrast (superficial). Both depend upon identification, upon the adoption of the identity point of view (law of simultaneous unity).

The following section (pp. 141-256) discusses, with great minuteness, the illusions of division and composition. Here the reading becomes difficult. Indeed, the work as a whole is the reverse of easy. The reader should be warned never to pass over a back-reference, and never to attempt the book unless he has pen and ruler and compasses at his elbow. In ch. 29 of this section (varying magnitudes of the parts) he will do well to draw a rough system of curves, for guidance in future chapters. Very careful study is required, if justice is to be done to the author's reasoning.

We set out with primary conditions of illusion. Let us look at the whole: then the part, as part, has only that tendency to expansion which is peculiar to the whole in all its parts; the part is underestimated. Contrariwise, let us look at the part: then the part is not simply part, but also itself extension; the divided whole is overestimated. Over against these stand the secondary conditions. The part, as filling out the whole, as extending within it, should be overestimated; the divided whole, the space within which the parts bound each other independently, should be underestimated. The appeal is to experience; and experience defines the mutual relations of the conditions as follows: reference of the limits of the whole to the part means underestimation of the part; reference of the part to the limits of the whole means its overestimation. The greater the part in relation to the whole, the more is the part over, the whole underestimated; the smaller the part, the more is it under, the whole overestimated. True, this is merely a rough statement. The quality of the part, its qualitative relation to the whole in which it stands, affects the illusions. And in estimating the influence of the varying size of the parts we have to distinguish a quantitative factor in the apparent shortening of the whole (*i. e.*,

the quantum of tendency to expansion that is held in equilibrium by the limits of the part) from a 'gradual' factor (the grade of the limiting activity): their interplay gives three maxima and two minima of apparent length. Instances are the symmetrically trisected point distance, and the smaller circle placed concentrically within a larger. Quality again has its effect. But in making distinctions of quality within the parts of a whole we have traveled beyond the illusions of division proper; we can pass to those arising from the connection of distances (or lines) with surfaces. These lead us still further, by way of distances embraced between triangles, to the illusions set up by the coincidence of activities (1) whose directions are opposed, and (2) whose directions are relatively the same.

Here belongs the famous 'optical paradox,' the 'arrow-head and feather illusion,' the 'illusion of Müller-Lyer.' We may give Professor Lipps' account of it as an instance of his general treatment. Why do we overestimate the length of the horizontal line that lies between diverging end-pieces? The answer is this: "The terminal points of the line limit it, and limit also the oblique pieces. This second limiting activity works upwards and downwards, in so far as the oblique pieces trend upwards and downwards. It works outwards, in the horizontal direction, in so far as the oblique pieces trend outwards. Just in so far as this is the case must the limiting activity of the terminal points towards the inside, towards the horizontal line itself, be canceled by their limiting activity outwards, towards the oblique pieces. To the same degree, of course, the limiting activity of the points towards the oblique pieces is canceled by their activity on the side of the horizontal line. That is to say: the length of all these lines is overestimated." It follows that the illusion increases, within certain limits, with approximation of the oblique pieces to the horizontal; and that it decreases with increasing length of these pieces. Why, on the other hand, do we underestimate the length of the horizontal line that lies between converging end-pieces? "The limiting activity which the common terminal point exerts upon the horizontal line, and the limiting activities, relatively of the same direction, which it exerts upon the oblique pieces, reinforce one another." The illusion is less than in the former case, because the tension (produced as reaction by the increase of the limiting activity) is greater. The effect of the relative obliquity of the end-pieces is the same; that of their length naturally the precise opposite.

We come, in the third place, to the illusions of direction (pp. 257-320). They may arise under three conditions: when the differently directed forms or form elements are given contiguous; when change of direction occurs during the course of a single movement; when the different directions, though independent of one another, are spatially coincident. The vertical and (to a less degree) the horizontal directions are in every instance 'principal' directions. As the modifying activity is in all these cases the primary, there is a constant tendency to the overestimation of differences of direction, (The relation of this rule to the current theory of angular estimation is plain.) The principle that dominates the section is the principle of the 'mechanically unitary apprehension of directions'; and its rule runs: "If, in consequence of the conditions under which it takes place, a movement divides for our idea into various components, then in every case (or in every phase of the movement) that component is overestimated which in general (or in the particular phase) is most 'drawn upon,' or whose realization seems to be most energetically demanded, for the result be-

fore us." The rule evidently covers cases of apparent approximation as well as cases of apparent divergence of directions.

The final section (pp. 321-419) treats of variations of contour (superficial boundary). These take us back to the 'identification' question of the first section. Let the surfaces stand independently side by side; then we give them in idea an expansive tendency that fits their actual magnitude. Here come the illusions dependent on interaction of height and breadth. Let them now form parts of a single, differentiated whole: then we give them, despite their different size, one and the same expansive tendency. Here come the illusions of (rectangular) projection and retraction. From these we pass to those of reduction or tapering, taken first alone, then in connection with opposition of direction (where we are brought to the optical paradox again), and lastly in connection with axial activity. Reduction passes over, in its extreme form, to the point or gable. Finally, leaving right lines, the author discusses the effect of continuous curvature of the boundary, taking as his illustrations the scotia and the torus, the concave and the convex departure from the vertical.

In an epilogue Professor Lipps emphasizes the threefold result of his inquiry. He has, in principle, settled the question of optical illusion. Secondly,—and this is more important,—he has contributed to the establishment of an 'æsthetical mechanics,' to our æsthetical comprehension of the geometrical forms employed by the arts. And thirdly, he has illustrated the delicacy and uniformity of the psychological working of 'unconscious ideas.'

Of the æsthetic part of the work I have, in the above hasty sketch of its contents, said very little. In reality, there are æsthetic 'additions' at every pause in the march of the argument. As, however, the writer's whole æsthetic theory, the theory of 'mechanical anthropomorphism' or of 'anthropomorphic mechanics,' the harmony of the free activity of the human personality with the uniformities of mechanical forces, is given in the introduction,—and as the 'additions' merely carry out the general point of view in detail, showing where the optical illusion is a protest against the æsthetically (because mechanically) impossible, etc.,—it seems unnecessary to devote space to it here. Nevertheless, I believe that the æsthetic theory is, relatively, the strongest thing in the book, and, absolutely, a theory of the very highest scientific value.<sup>1</sup> Indeed, the æsthetic atmosphere is over all: the book at large, if we regard chs. 29-36 as an excursus (p. viii), is æsthetically planned and proportioned. Starting out from the Doric column, we find at the end of our reading that we have been taken through the Doric and Ionic orders, stylobate, column, entablature and pediment, step by step, illusion by illusion; torus and fillet and scotia of the base, fluting and entasis of the shaft, ovolo and abacus of the capital, architrave and frieze and cornice,—all have received their due meed of discussion and explanation. Moreover, the idea of linking the whole series of geometrical optical illusions to an all-embracing æsthetic theory is both novel and remarkable. The question is, whether it has been—whether it can be—carried out.

We must admit that Professor Lipps has been able to account for all the optical illusions that are familiar to us from the many recent essays upon the subject. We may admit, too,—at least, this is the impression that I have obtained from the book; I am not sure how far it is a true one—that his principle of explanation has a heuristic value. But serious objections present themselves to his point of

<sup>1</sup> The outline of a similar theory was roughly sketched by Vernon Lee and C. Anstruther-Thompson in the *Contemporary Review*, Oct. and Nov., 1897.

view. (1) Can we travel, without more ado, from the real, tri-dimensional, undoubtedly 'purposive' structure, column or tree or tower, to the superficial or linear figure, the bare line or circle or square? We easily and consciously read our own activity into the former; I have hardly ever found myself doing so into the latter. I can, with some effort, 'feel' the solidity of the black disc on a white background, and the hollowness, emptiness, of the white on black; I can also read movement into the Müller-Lyer lines; and I can sympathize with the smooth or unsmooth flow of the line in the corrected or uncorrected segmental and stilted arch. But in the first of these cases I call to aid a tri-dimensional secondary idea, and in the second and third I seem myself to move with or along the lines, rather than to let them move or carry movement. I should, therefore, incline to doubt Professor Lipps' statement that solidity presents 'in principle' nothing new as compared with superficial extension (*Zeits.*, *loc. cit.*, p. 41), and his conclusion that our apprehension of the plane geometrical figure follows on directly from that of the tri-dimensional structure. (2) But the reply is obvious: the 'reading in' of activity in cases of illusion is 'unconscious,' stereotyped in us by habit; so far from its being necessary for us to realize our personifications, it would be curious if we did so (*Zeits.*, *loc. cit.*, pp. 43, 44). To which I offer the counter-reply: If I am not now tempted in any way by the forms themselves to read my activity into them, why should my ancestors have done this, and done it so much as a matter of course and habit that their attitude has laid permanent constraint upon me? What was so highly conscious once, surely might be at least weakly conscious now, more especially now that I am trying to make it conscious. Professor Lipps has written a 'logic' or 'mathematics' (p. 170) of optical illusion, and his method has led him to rectify certain too general statements of former theories (pp. 220, 147, 271); but unless one is prepared to accept the Herbartian unconscious, with all its implications, one can hardly grant that the theory is psychological. Apart from such school dogma, I can see no reason whatsoever (Professor Lipps complains in his *Festschrift* paper that utterances upon this point are vague) against regarding the great bulk of optical illusions as matters of perception, and not of judgment. (3) A third objection, which I am less confident in urging, is this: Does not the apparent heuristic value of the writer's theory lie in the fact that it is able to adapt itself *ex post facto* to all and every illusion? Professor Lipps asserts or admits (p. 287) that it is a tautology: the primary activity produces the illusion,—but then the 'primary' activity is just that activity which does produce the illusion. There is no arguing with a theory which would find the facts equally intelligible if they were given upside-down; and I cannot help thinking that the present theory would hold its own very well in an inverted world.

Of the general importance of the work there can be no doubt. It is a model of patient constructive argumentation. Psychologists would owe a still greater debt of gratitude to the author if he should now publish a detailed critique of rival theories: there is no one of them, he says (p. 421), which, if taken seriously, does not break down under the weight of factual exceptions. This is a hard saying, and must be tested. In conclusion, I would advise the reader to make an index of figures as he proceeds; the lack of indices means much loss of time.

Professor Wundt's monograph has appeared so lately that any review at the present time must show signs of imperfect assimila-

tion. Nevertheless, it stands in such marked contrast to Professor Lipps' book that some notice must be taken of it in this connection. The work was suggested by, or grew out of, the recent investigation by Thiéry (*Phil. Stud.*, XII, p. 125). The treatment is historical; Oppel's figures are constantly referred to. Here, at once, is a great difference between the two inquiries.

Wundt begins by laying down methodological rules. Complex figures, showing many illusion-motives, must be split up into simpler; figures whose illusion may be due to coincident motives must be varied in such a way as to exclude one motive after another; great weight is to be attached to reversible illusions, since in them the only change of conditions lies in the perceiving subject. As heuristic maxim we have the rule that physiological conditions must be regarded as primary, other things equal, psychological as secondary. (Pp. 1-6. Cf. Lipps, p. vii.)

The investigation sets out from the reversible illusions of perspective (pp. 6-30). By variation of conditions and test of other proposed explanations, the conclusion is reached that "the physiological conditions [of these illusions] consist in the *fixation* of the objects by the eye and the *movement* of the point of regard along definite contours." The irreversible illusions fall, first, into those of extension and of direction. Illusions of each class may be variable (changing in magnitude and perhaps even in quality with change of conditions) or constant. The former are accompanied by irreversible illusions of perspective; the latter either have no such concomitants, or have them under quite different conditions.

We pass, then, to the variable illusions of extension (pp. 30-53). Here belong the illusions of filled and open linear extensions, of the vertically and horizontally fluted square, the optical paradox, Laska's illusion (apparently varying length of line with varying size of inclosed angle), etc. It is shown that the illusion of perspective is secondary, that of size primary. Helmholtz' contrast theory, Müller-Lyer's confluxion, Heymans' movement contrast (cf. *Phil. Stud.*, xviii., pp. 613 ff.) are weighed and found wanting. The illusions are due to the motives to movement of the line of regard which reside in the nature of the objects as given.

Under the constant illusions of extension (pp. 53-61) fall the overestimation of verticals as compared with horizontals, the overestimation of the upper half of a vertical, and the (monocular) overestimation of the outward horizontal. The perspective theory is here out of court: we must fall back upon dioptrical or muscular asymmetry. By elimination, we are left with the latter as the sole explanation. The absence of the illusions in the circle is an indirect confirmation of this standpoint.

The variable illusions of direction (pp. 51-78) bring us to the question of the estimation of angles, to Hering's and Zöllner's patterns. Perspective comes to its rights again, as secondary motive. It is most interesting to compare Wundt's account of the illusion and lack of illusion in the series of superposed horizontal arcs (overestimation of the acute tangential angles and arousal of perspective) with Lipps' discussion on pp. 314 ff. There seems to be no doubt that Wundt's explanation of his Fig. 40 (cf. his analysis of Figs. 59 and 60) explains also Lipps' Fig. 155; but the reader must judge for himself. Wundt accounts for the overestimation of small angles by an extension of Delbœuf's idea: "where mechanical movements of short duration are produced," he says, "but movements which differ in duration in the individual case while their other conditions remain the same, there is consumption of a relatively greater amount of energy in the shorter movement, since it



requires greater energy to start a definite movement than it does to keep a present movement going." Movements of regard, then, are the condition of the illusions.

The constant illusion of upward divergence of parallel verticals is referred, also, to the eye muscles (J. Müller); Helmholtz' attempt at a retinal-image theory is not successful here any more than it was for the preceding illusions. Recklinghausen's illusion in indirect vision is explained by the change in retinal image caused by projection in space as determined by eye movement. (Pp. 78-85.)

So far we have had illusions due to physiological motives. There are others (pp. 85-93) that are due to the direct arousal of the psychological process of association, and that may therefore be termed 'illusions of association.' The illusion here, as in the former instances—Wundt is explicit upon the point—is a matter of sense-perception, not of judgment; but its direct origination is psychological, not physiological. We may distinguish illusions of approximation and illusions of contrast. Typical of the former is the line unevenly divided into three parts, which seems to be evenly trisected; typical of the latter, the Ebbinghaus circle-figures (Lipps, p. 222).

Finally, we reach illusions that result from a complexity of motives (pp. 93-105). These may be wholly physiological (mixture of variable and constant), as in the torus and scotia illusion, the illusions in the triangle, Poggendorff's illusion, Loeb's illusion; or partly physiological and partly associative, as in the interrupted circle of Müller-Lyer, superposed segments, Oppel's double and single circles, etc.

These, then, are the facts. There follows a critique of theories (pp. 105-116). We have the psychological 'mother-theory,' of deception of judgment by imagination. Out of this have come the perspective theory of Hering, Guye, Thiéry; the contrast theory of Helmholtz, Heymans, Loeb (somewhat better is the contrast-confluxion theory of Müller-Lyer); and the mechanical-æsthetical theory of Lipps,—known to Wundt only from the *Festschrift* and *Zeitsch.* papers, etc., not from the book. The author criticises this theory from very much the same point of view as that which I have adopted above, but urges some further objections to it. Just by reason of its æsthetic unity, he says, it cannot take account of the empirical interplay of motives; it neglects the reversible perspective illusions, the secondary perspective ideas, the influence of movements of the line of regard, etc. Wundt's own theory (pp. 116-126) seeks the motives to illusion in the process of perception itself. On the extreme physiological side we have the 'constant' illusions of the text; then come the 'reversible' and 'variable' illusions motivated by retinal-image (fixation) and eye-movement, with their psychological correlate of the 'assimilation' of ideational elements; while on the psychological side stand the 'association' illusions, the result of the interrelation or the reciprocal influence of simultaneous perceptions. The retinal image needs no discussion. And we know that extensive eye movements give rise to sensations; we must, therefore, assume that less extensive movements do so too, only that they are 'fused,' so to speak, in the idea of 'change of position,' just as slight touches are referred to the objects that affect the skin. If the illusion persists for the resting eye, that is because the points of the figure not now fixated nevertheless stimulate the eye to movement, and the 'stimulation' works as actual traversing of the space, actual eye movement, would work.

Professor Lipps' by-the-way remarks concerning eye-movement (p. 310) are, I think, more than met by Wundt's polemic against the

'unconscious inferences' and general logical tendencies of popular psychology. Wundt has shown conclusively that a great many illusions can be explained as visual assimilations, whose physiological conditions are fixation and movement of regard. On the other hand, while I do not doubt that many other illusions are really 'associative,' due to the conscious arousal of associated visual ideas, I cannot find the concepts of 'approximation' and 'contrast' entirely satisfactory. Color contrast, which Wundt instances in connection with them, is, surely, a different thing altogether; it is, as Hering and his pupils have sufficiently shown, a matter of sensation, of physiological changes at the periphery. The 'law of relativity' is too vague to account for the details of illusion.<sup>1</sup> Perhaps it may be possible, by continued investigation, to find a working physiological hypothesis for the outlying group of facts. In any case, the incompleteness of Wundt's account seems preferable, in the present state of psychological knowledge, to the over-adequacy or 'tautology' of Lipps' theory.<sup>2</sup>

E. B. T.

- (68) *Geschichte der neueren deutschen Psychologie*. MAX DESOIR. 2<sup>e</sup> Auflage, 1<sup>er</sup> Halbband, pp. 356. Carl Duncker, Berlin, 1897.

One volume only of Dr. Dessoir's history has appeared (1894). We now have this volume, or a part of it, in second edition. Criticism of the earlier output confessed to the author's great diligence in covering an immense mass of literature, for the most part now dead, but pointed out serious defects in matter and in arrangement. The new edition, "eine völlig neue Bearbeitung des Gegenstands," calls for careful scrutiny and evaluation.

The plan of the work shows major changes in matter and form. A new introduction on ancient, mediæval and recent psychology, and a bibliography are affixed. The author's profession of an invariable use of primary sources in the modern period is a timely defense against the charge of inaccuracy. Lengthy citations are avoided and there is an evident effort to shun prolixity. Fuller treatment of the psychology of the last century has crowded out the more constructive part of the first edition, the part of most doubtful value. For the revision of this we must wait.

In Part I, named "Die Begründung der deutschen Psychologie," are sections on Leibniz, Thomasius, Wolff, his followers and opponents, and eclectics. The systems of Leibniz and Wolff have been reconsidered and their essentials presented in much more comprehensive form, while Rüdiger and Crusius, two chief opponents of Wolff, are allowed freer utterance. Nearly double the space has been allotted this division. Part II occupies two-thirds of the volume and gives the development of the "Erfahrungsseelenlehre" in Germany from 1750 to 1800. The corresponding part of the first

<sup>1</sup>To be concrete. Suppose that it could be shown that the estimation of the central circles in Ebbinghaus' figures is explicable (say in terms of energy of movement; cf. Wundt's explanation as regards acute and obtuse angles) as an absolute illusion; that the one circle is overestimated, the other underestimated, whether the two figures are given together or not. The contrast illusion would, of course, follow: but it would not be due to the juxtaposition of the two figures, the interrelation of perceptions, but rather to the pre-existence of physiological (assimilative) motives to illusion in each figure. The psychological 'contrast' would thus be reduced to perceptual processes with an intelligible physical substrate. In the meantime, Loeb's assertion of a space-contrast and attribution of space-values to the retinal elements ('space' being on a par with 'color,' *e. g.*) must remain wholly unconvincing to psychologists. Herbartian or other (see *Zeitsch.*, xvi, p. 298).

<sup>2</sup>Some of Wundt's statements as to motives to illusion appear, in the light of Lipps' work, to be too sweeping: see the critique of Lipps' theory above. But the necessary modifications can easily be made, without prejudice to the general standpoint.